

951,989.

Patented Mar. 15, 1910.

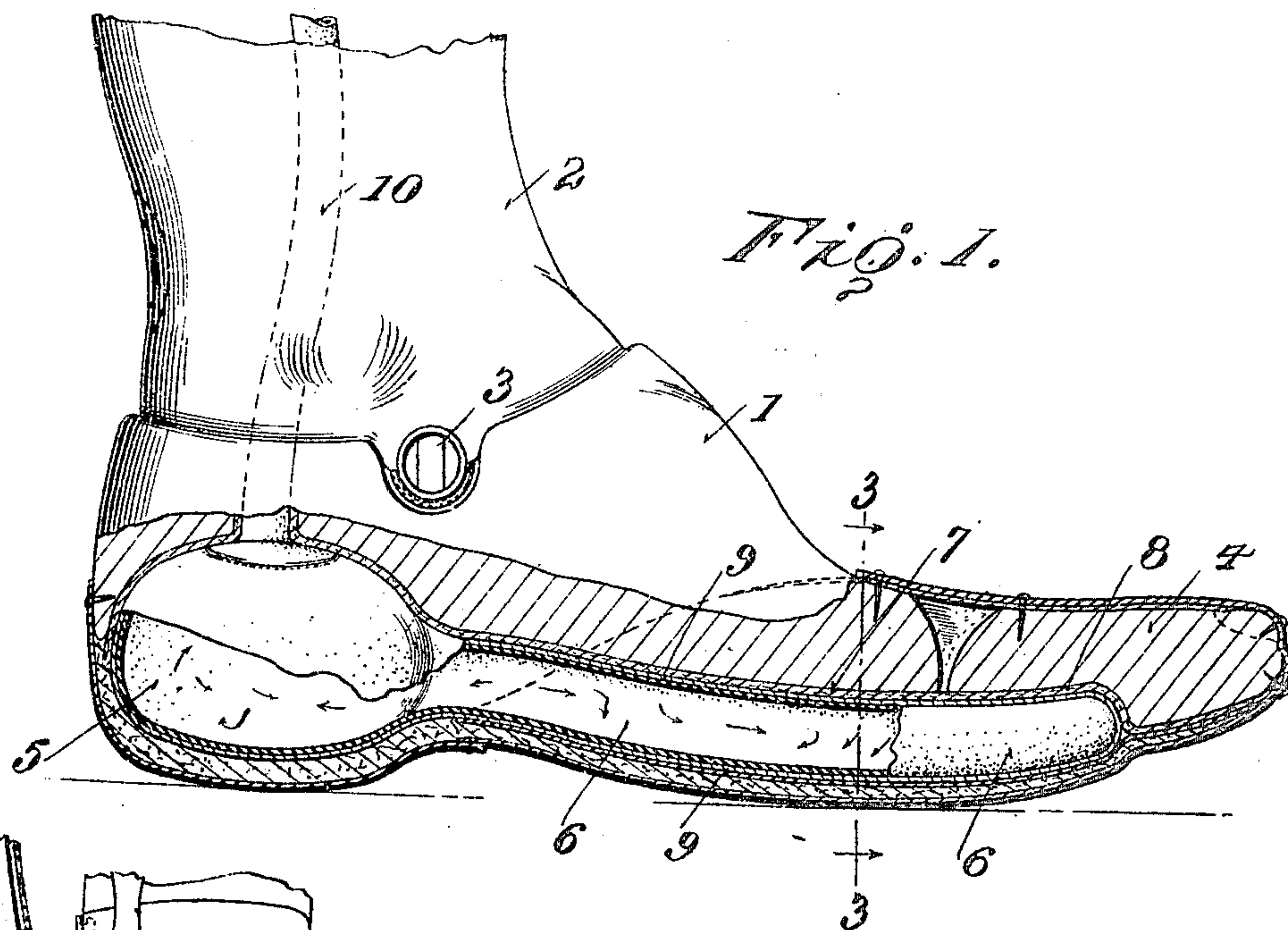


Fig. 1.

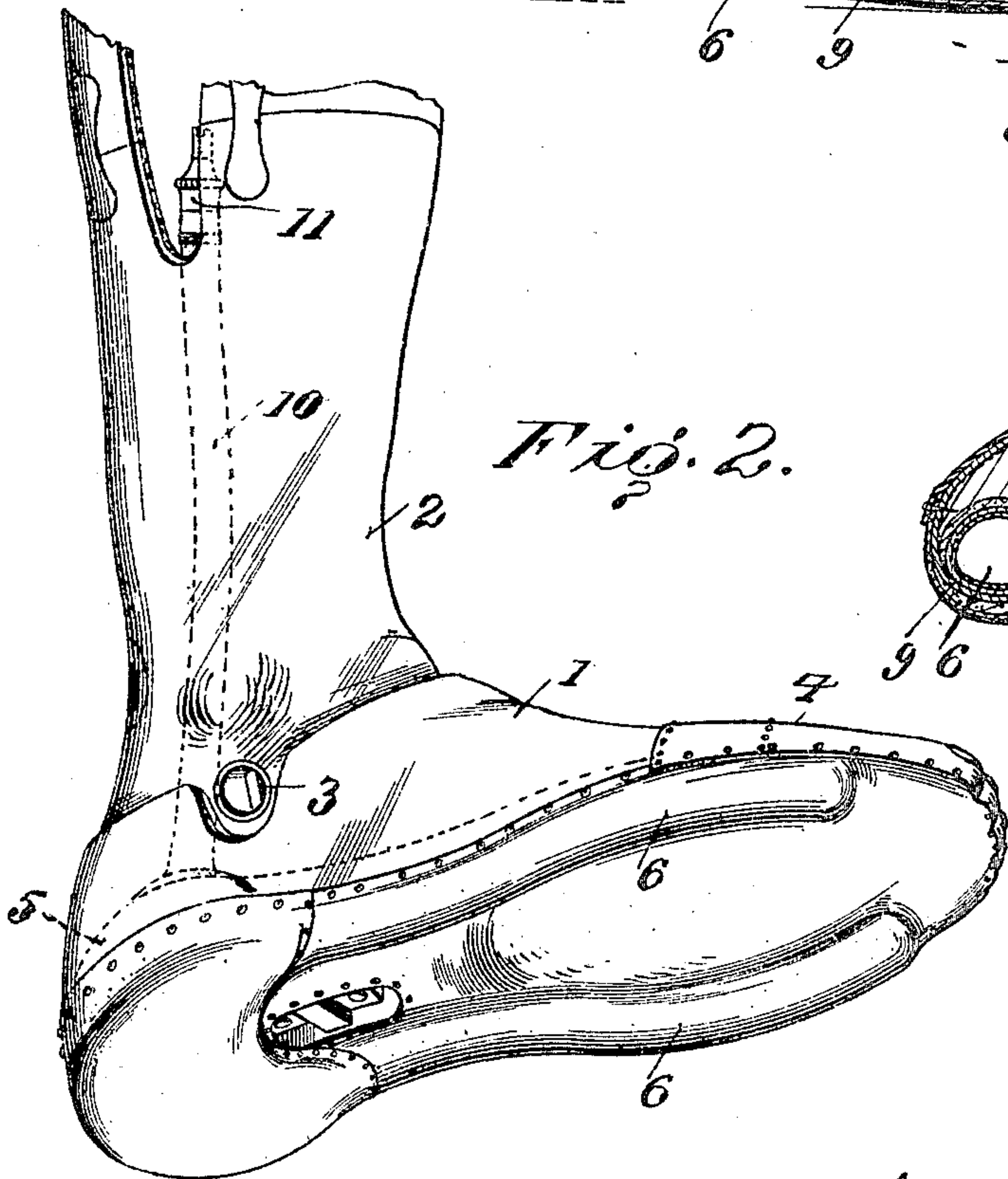


Fig. 2.

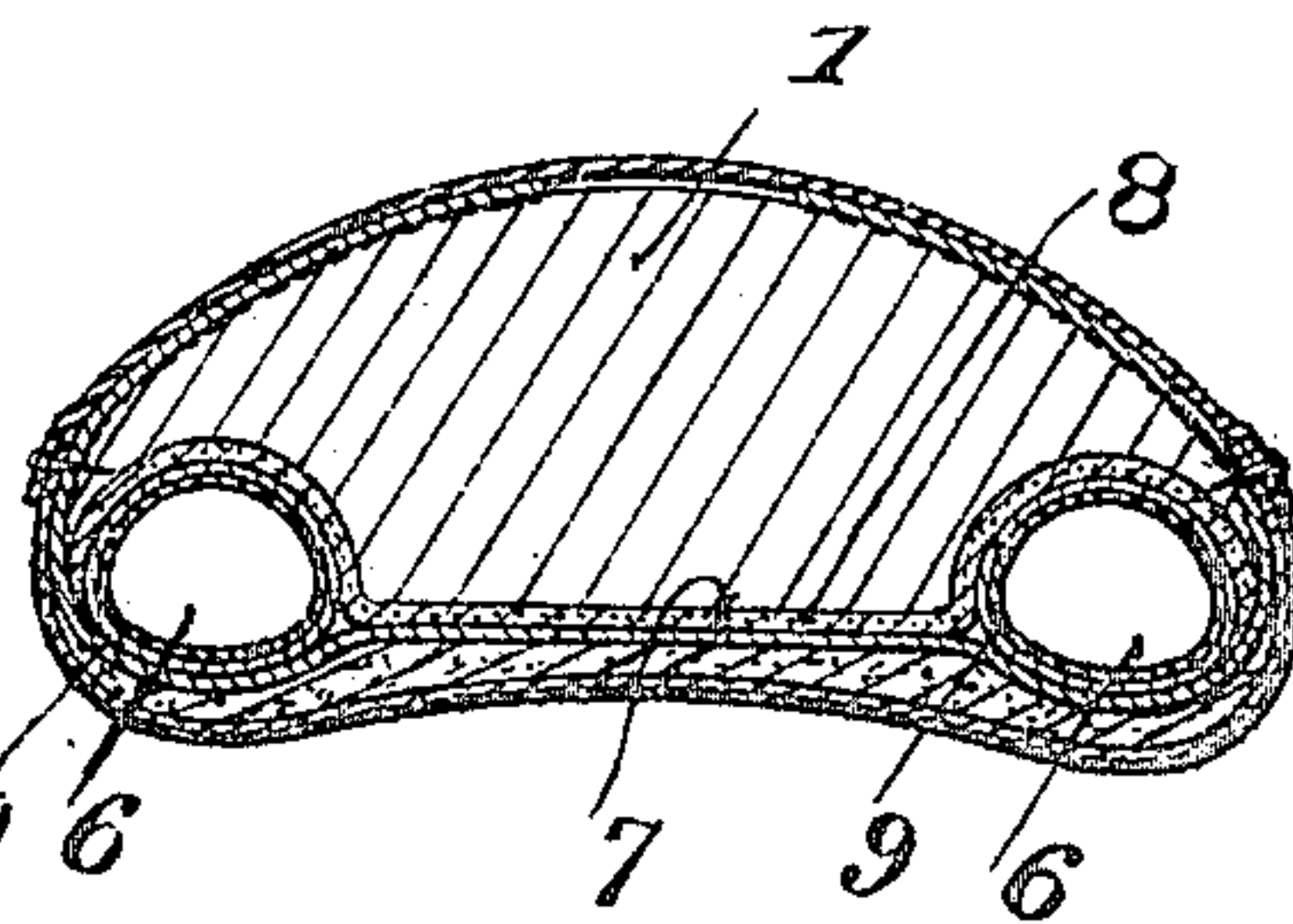


Fig. 3.

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UNITED STATES PATENT OFFICE.

JAMES E. HANGER, OF WASHINGTON, DISTRICT OF COLUMBIA.

ARTIFICIAL LIMB.

951,989.

Specification of Letters Patent. Patented Mar. 15, 1910.

Application filed July 9, 1908. Serial No. 442,646.

To all whom it may concern:

Be it known that I, JAMES E. HANGER, of Washington, District of Columbia, have invented a new and useful Improvement in Artificial Limbs, which improvement is fully set forth in the following specification.

This invention relates to artificial limbs, and more particularly to the foot portions thereof, and has for its object to provide a yielding portion thereof which shall form an elastic base for the foot and cause the same to be comparatively noiseless in use, thereby more nearly simulating the natural foot. Heretofore attempts have been made to accomplish these objects by the provision of an entire pneumatic foot or of certain pneumatic portions thereof, and one of the difficulties experienced has been that in case the air or other gas with which the pneumatic portion of the foot is charged is released in any way by a puncture or a leaky valve, the foot collapses to a greater or less extent, thus leaving the wearer in an awkward and unsatisfactory condition until the repair is made or the pneumatic portion recharged.

The object of the present invention is to provide a foot of the class indicated which shall afford the yielding and noiseless action desirable in such structures, while at the same time obviating the objections incident to the possible puncture or other means for deflation of the pneumatic portion.

With these objects in view the invention consists in a foot composed of any suitable material such as wood or felt or wood and felt provided with a pneumatic chamber or cushion for the heel and with two pneumatic chambers located one along each side of the foot, said chambers when expanded affording the yielding action at the heel and a light yielding action on each side of the foot, whereby the foot would be slightly spread or expanded like the natural foot, thereby causing the same to produce the same action upon the shoe of the wearer as would occur in the natural foot, thus obviating the tightly-drawn and objectionable appearance of the shoe ordinarily worn on a wooden foot. These three pneumatic chambers may, if desired, be made separate and independent of each other, and means provided for separately charging each chamber. Preferably, however, the lateral channels are connected at their rear ends with the heel chamber, to the end that a single charging orifice may be provided for the three chambers. Prefer-

ably also the sole or bottom portion of the foot is recessed for the reception of the heel and lateral chambers so that the same project but slightly below the normal level of the foot and there is thus left between the two lateral chambers a solid sole portion of the foot, to the end that in case deflation of the chambers occurs through any cause, such solid or un-cutaway portion of the sole affords a firm tread portion for the support of the wearer. The result of this construction is that in ordinary use the properties incident to the elastic portions or chambers are all present while at the same time the foot remains in a fairly usable state in case of accidental deflation.

The inventive idea involved is capable of a variety of mechanical expressions, one of which for the purpose of illustrating the invention is shown in the accompanying drawings, in which—

Figure 1 is an elevation, partly in section; of an artificial shoe embodying the invention; Fig. 2 is a perspective view of such a foot; and Fig. 3 is a transverse sectional view on the line 3—3, Fig. 1.

Referring to the drawings, 1 is any suitable foot portion hinged to the ankle portion 2 by any suitable hinge, as 3, and having the usual or any desired toe portion 4 jointed thereto in the usual or any suitable manner. The heel of the foot is more or less recessed and in said recess is located the pneumatic heel chamber 5, while the lateral pneumatic chambers 6—6 extend along the sides of the foot and preferably in recesses deep enough to receive and protect more or less of the said lateral chambers. As here shown the lateral chambers 6—6 are forward extensions of the heel chamber 5, though as stated above they might, if desired, be separate therefrom.

Between the lateral extensions 6—6 the central portion of the sole extends downward, preferably for at least half of the diameter of the lateral chambers 6—6, as shown at 7. Preferably the chambers 5 and 6—6 are composed of any air-tight material, such as rubber, and for the purpose of protecting the same against the abrading action of the body of the foot, the chambers are suitably protected as by a sheet of suitable fibrous material 8, felt being a very serviceable material for this purpose. If desired, the chambers 5 and 6—6 may also be further protected and strengthened

to avoid bursting under the strain incident to the weight of the wearer by wrapping the same with strips of strong fibrous material 9, such as canvas.

5 The chambers 5 and 6—6 may be charged with air in any suitable manner and, as here shown, there is provided a charging tube 10 extending upward through a perforation in the heel portion of the foot and into the
10 hollow portion of the leg, a suitable valve 11 being provided at the end of said tube whereby a charging tube from a pneumatic pump may be attached. This construction of valve 11 may be that of the ordinary bi-
15 cycle valve or any other suitable valve.

When the weight of the foot of the wearer is off of the foot and at the instant when it touches the ground, the inflated parts will appear as indicated in Fig. 2. The moment
20 the weight of the wearer falls upon the foot the heel portion which receives the main thrust takes up the jar and as the sole of the foot strikes the ground the two chambers 6—6 receive a portion of the weight and are
25 thereby expanded laterally, with the result that the foot is slightly spread at the sides, thereby expanding the shoe incasing the foot much as would occur in the natural foot. When the weight of the wearer is re-
30 moved from the foot these lateral channels and heel portion again assume their natural shape, permitting the shoe to slightly contract. The result of this action is that a shoe slightly looser than that ordinarily
35 worn on an artificial foot may be worn and its normal appearance will be that of the natural foot. In case the chambers 5 and 6—6 should become deflated for any cause, the weight of the wearer instead of falling
40 upon the pneumatic chambers 6—6 would rest upon the deflated heel portion and upon the central portion 7 of the sole of the foot, and while some of the advantages of the pneumatic foot would thus be lost the foot
45 would nevertheless be in a fairly usable condition until the chambers 5 and 6—6 could again be recharged.

Having thus described the invention what is claimed is:

50 1. In an artificial limb, a foot portion

provided with two pneumatic chambers extending one along each side of the sole thereof and means for charging said chambers.

2. In an artificial limb, a foot pro- 55
vided with two lateral recesses in the sole thereof one extending along the edge portion of each side of the foot, a pneumatic chamber located in each of said lateral recesses and means for charging said lateral 60
chambers.

3. In an artificial limb, a foot portion having a longitudinally-extending pneumatic chamber located on each side of the sole portion of the foot with a central por- 65
tion of the foot extending downward between said chambers, and means for charging said chambers.

4. In an artificial limb, a foot portion provided with a recessed heel and lateral 70
recesses extending from the said recessed heel forward along the sides of the sole of the foot and three pneumatic chambers one located in the recess of the heel and one located in each of the recesses along the sides 75
of the foot.

5. In an artificial limb, a foot portion provided with a recess in the heel thereof and lateral recesses extending from the heel forward along each side of the foot, an 80
air chamber located in the heel recess and an air chamber located in each of the lateral recesses, said three chambers communicating with each other, and means for simultaneously charging all three of said chambers. 85

6. In an artificial limb, a foot portion provided with a recessed heel and lateral recesses extending therefrom forward, and three connected pneumatic chambers located one in the heel and one in each of the said 90
lateral recesses, and means for charging said chambers.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses. 95

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Witnesses:

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